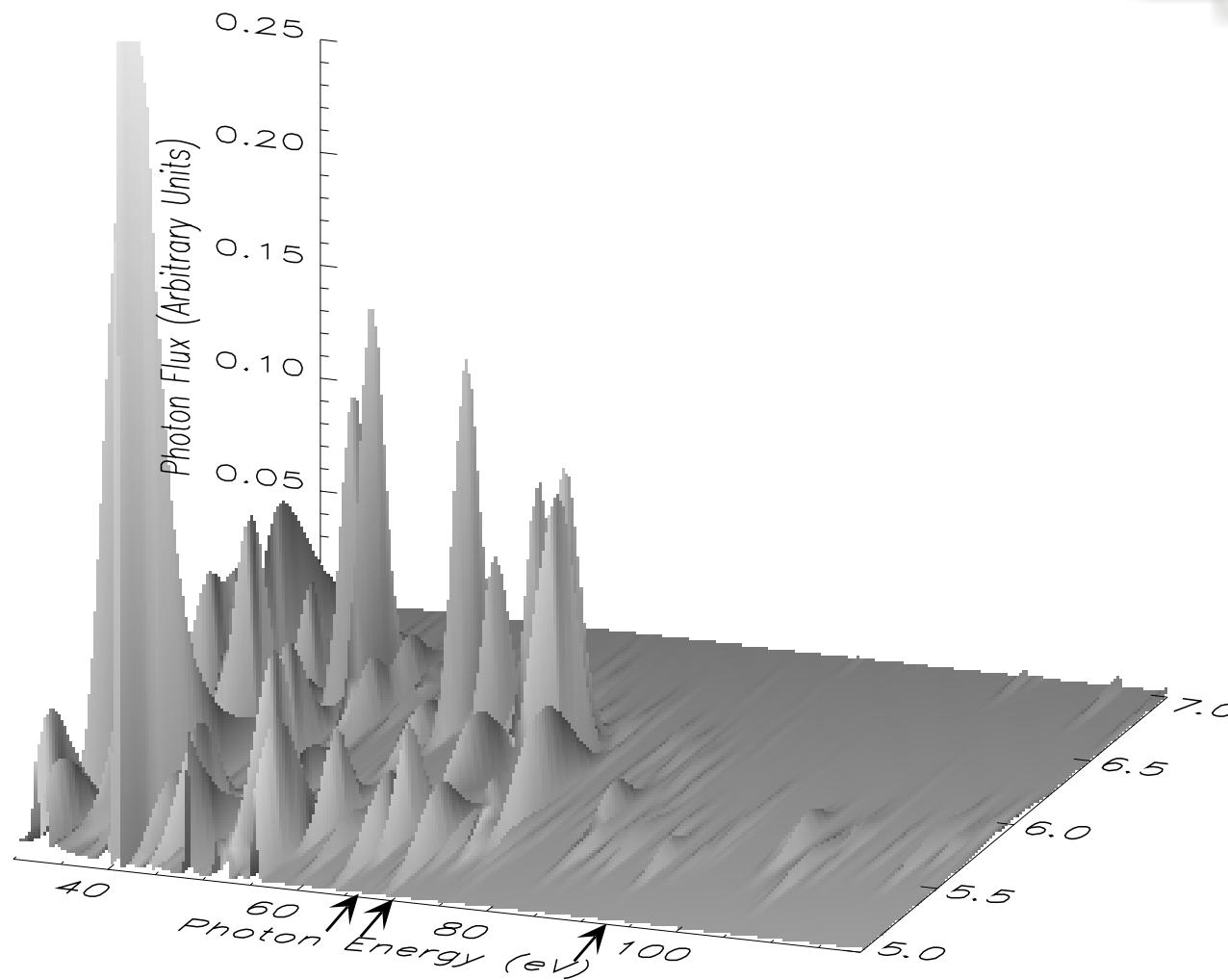
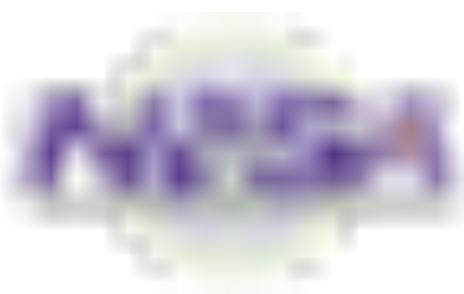


Limits on Emission from Fe IX - X from the Hot Local Interstellar Medium

Dr. Jeffrey J. Bloch

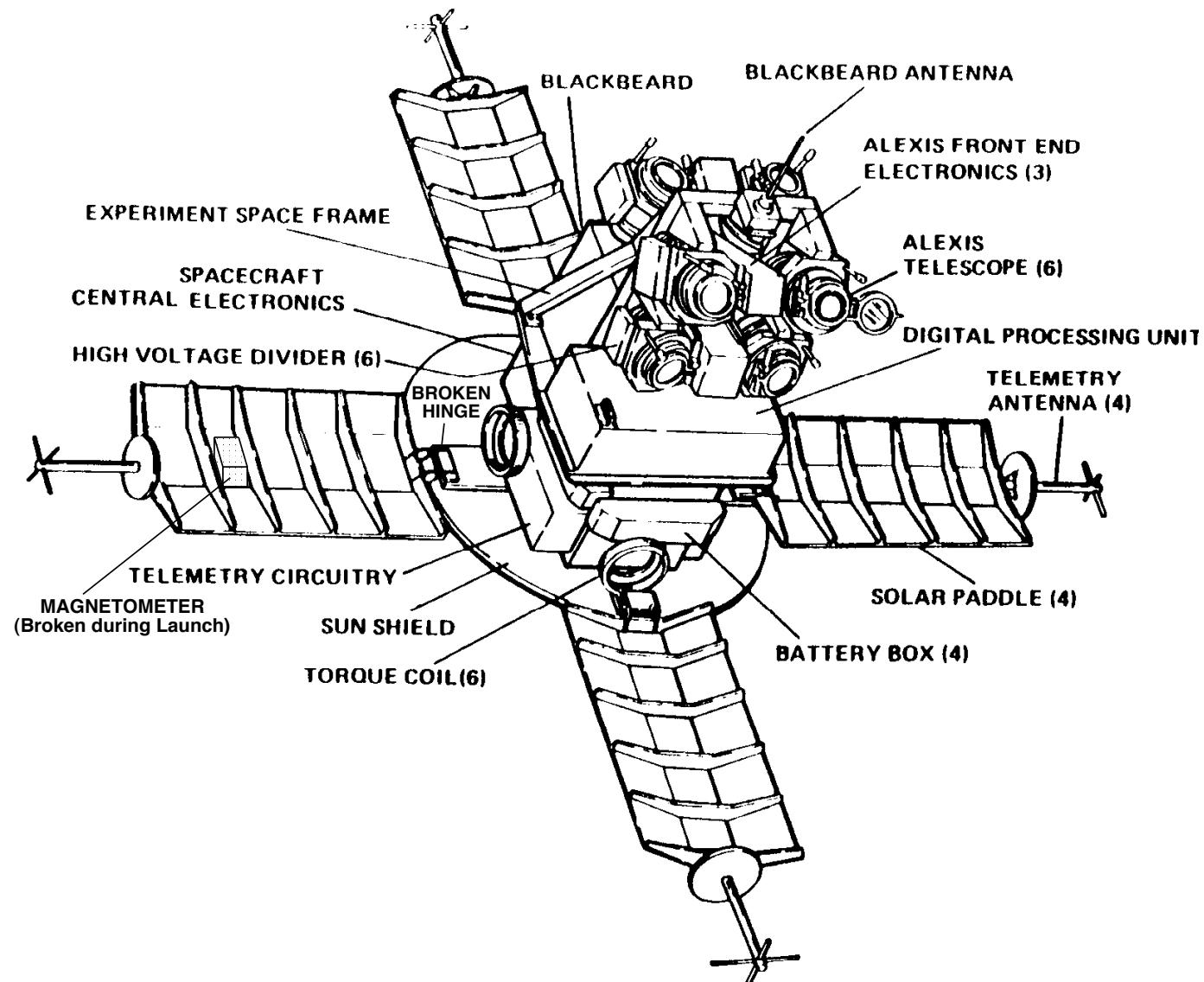
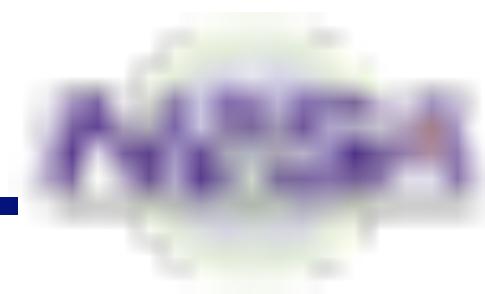
Space and Remote Sensing Sciences Group
Los Alamos National Laboratory

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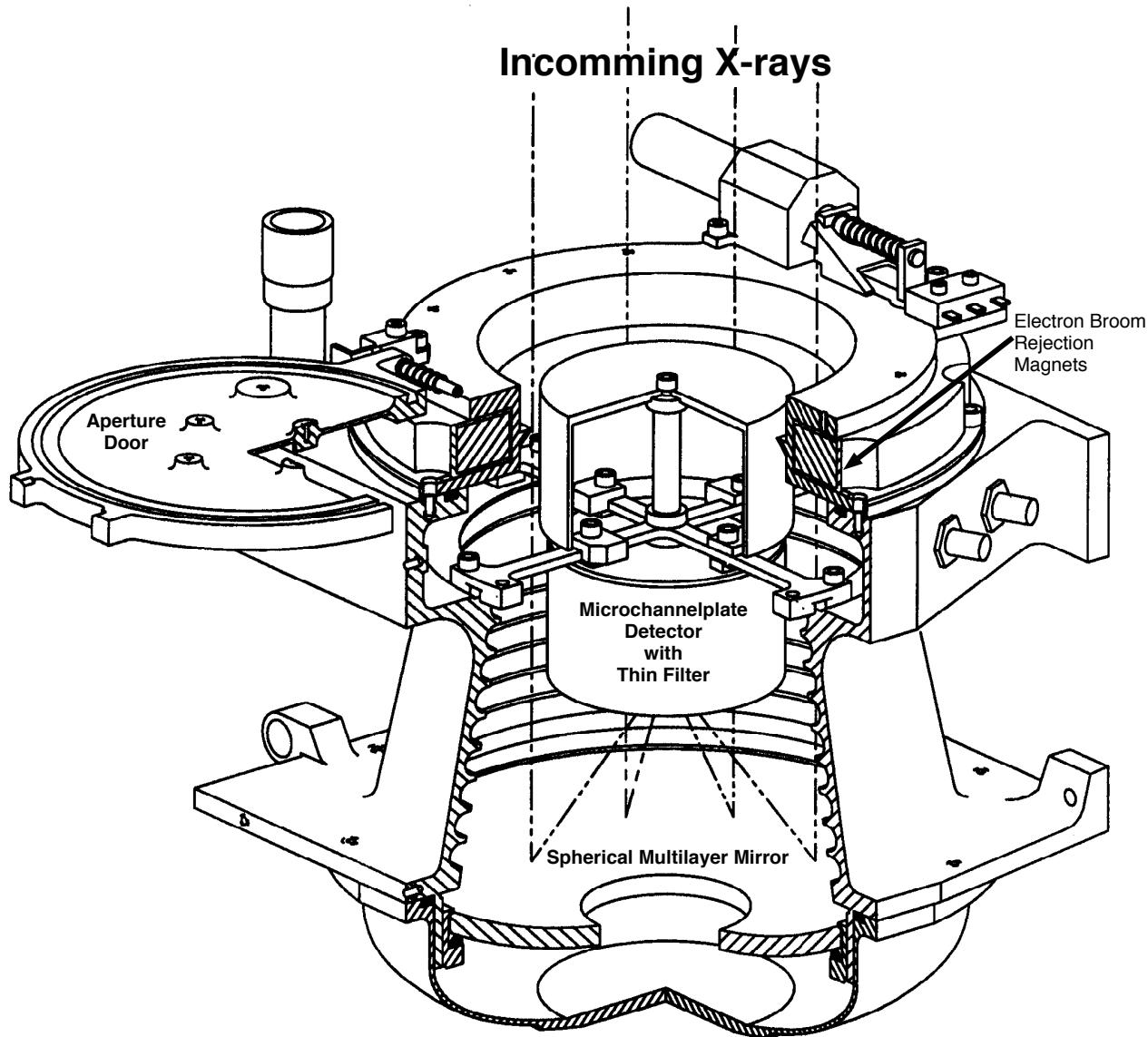


Photon spectrum from an optically thin hot plasma as a function of temperature. The arrows indicate the energy centers of the three ALEXIS telescope bandpasses.

ALEXIS Satellite

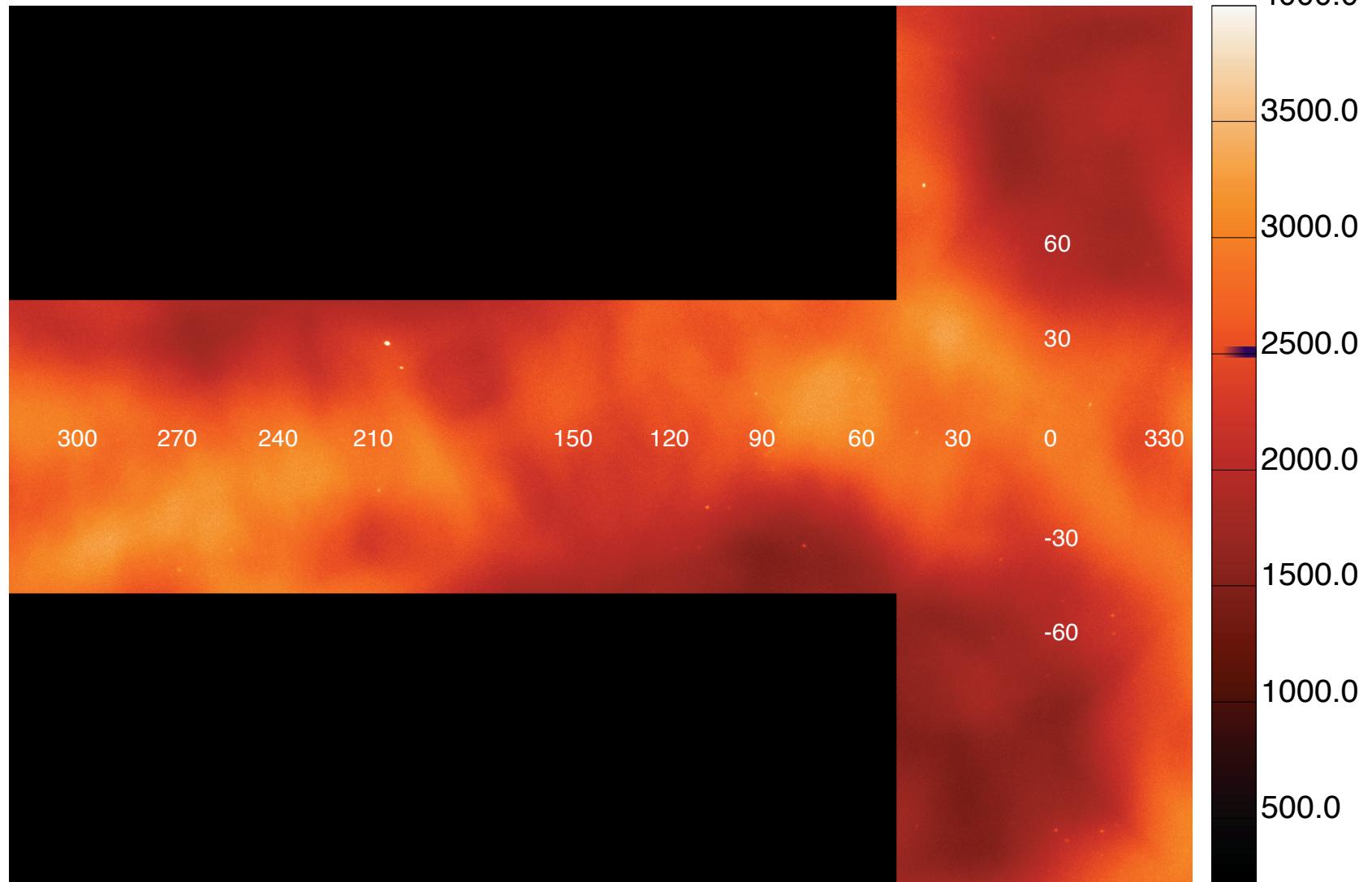


ALEXIS Telescope Cross Section



ALEXIS All-Sky Mission Raw Count Map

Telescopes 1B, 2B, 3A (171-190 Å) October 1993- November 1997

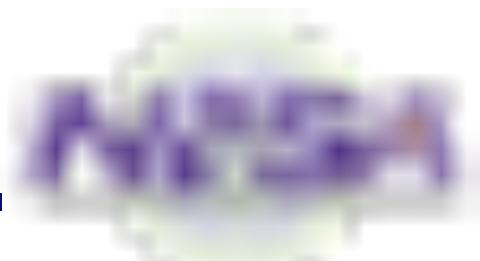


No Effective Exposure or Background Corrections Performed

Space and Remote Sensing Sciences

Los Alamos

Analysis Strategy



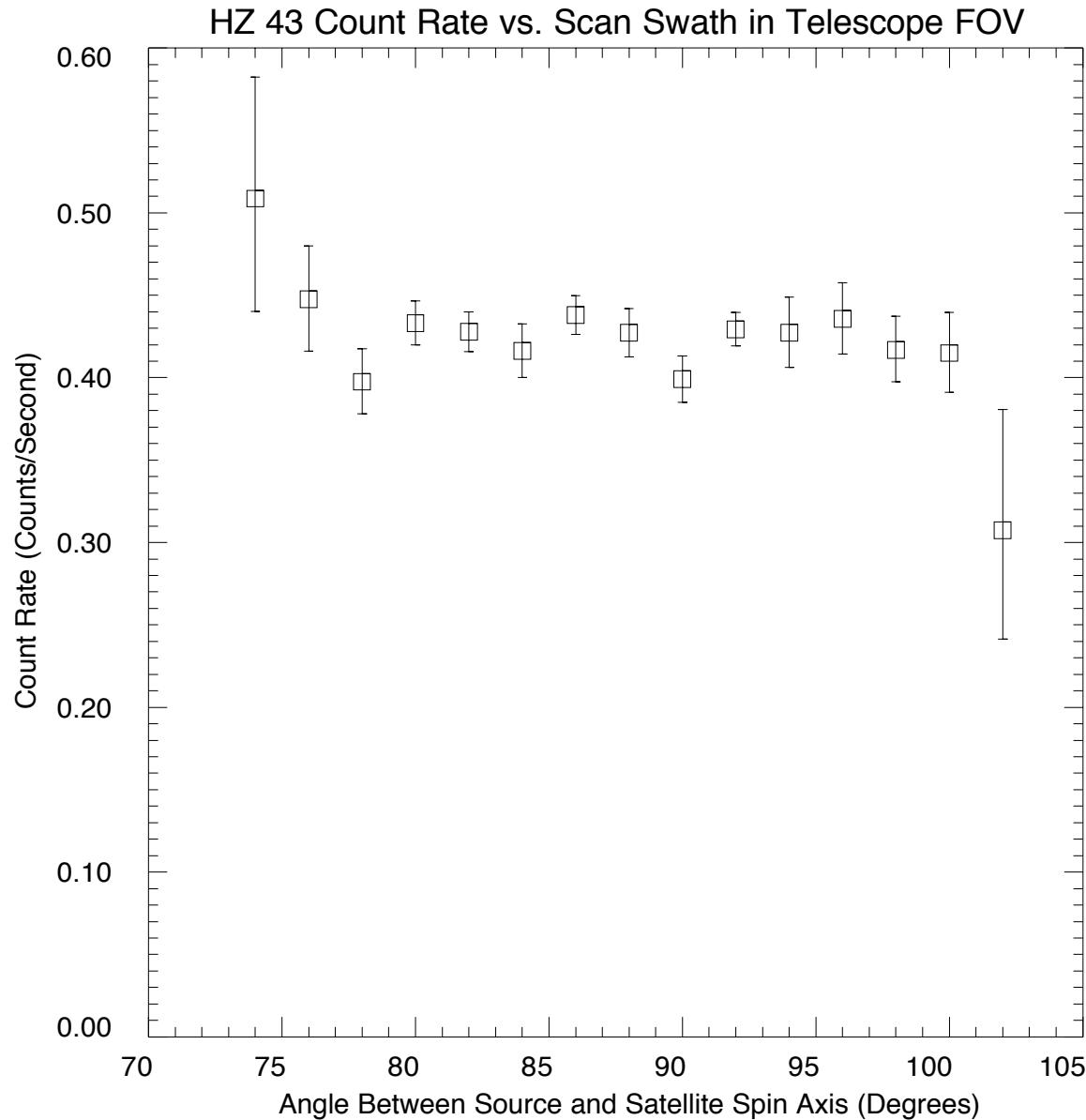
- Early sky maps showed no correlation with SXRB
- Complex non-cosmic backgrounds complicated analysis
- New Strategy: Use whole FOV of ALEXIS telescope as a “Light Bucket” for analysis.
 - Similar resolution to proportional counter maps
 - Use 0.5 second bin total rate scalar data for analysis
- Constantly scanning mode of operation actually aids in removing local backgrounds.
 - Same point on sky measured many times with different local system parameters

Calibration Strategy

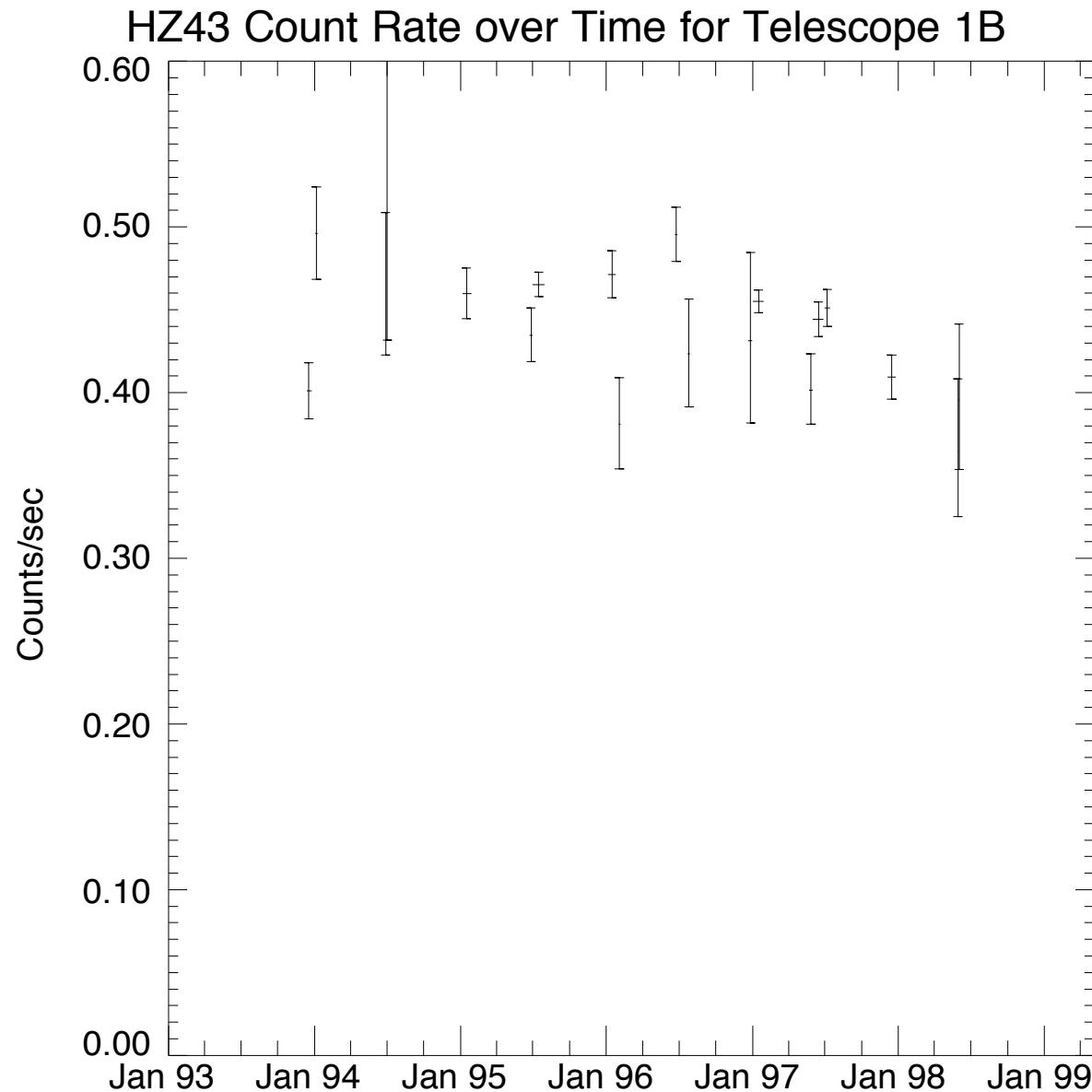


- End-to-End model constructed from component calibrations
- Pencil beam absolute throughput calibrations compared with end-to-end simulations of same measurements. Instrument model adjusted until agreement reached. This determined absolute efficiency on-axis.
- HZ 43 data used to correct relative vigneting function
- Corrected Instrument model used to compute area-solid angle product curve.
- Actual measured cosmic point source count rates compared to predicted rates using EUVE spectra used to verify instrument model.

HZ 43 Count Rate as Function of Scan Position in FOV

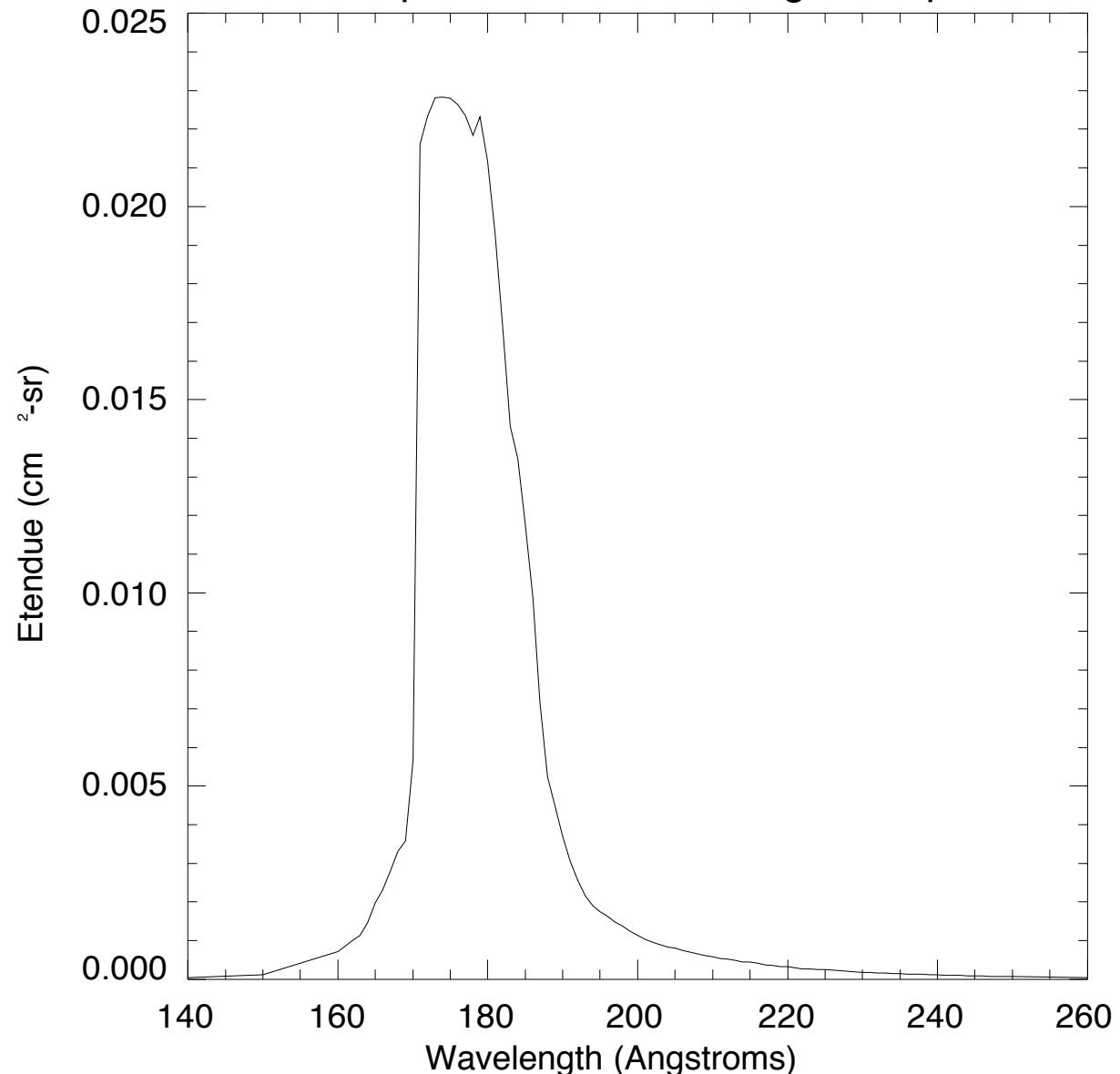


HZ 43 Count Rate as Function of Time Over Four Years

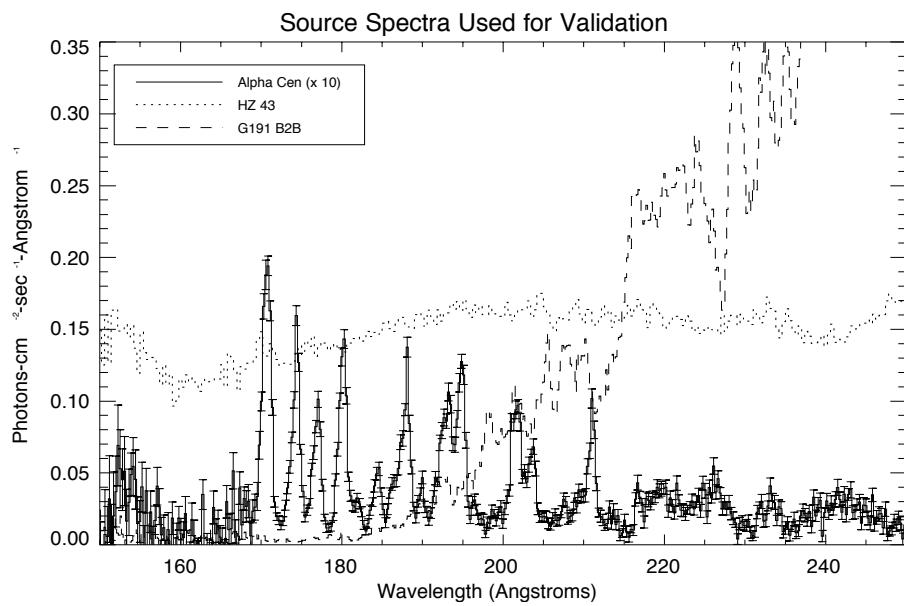
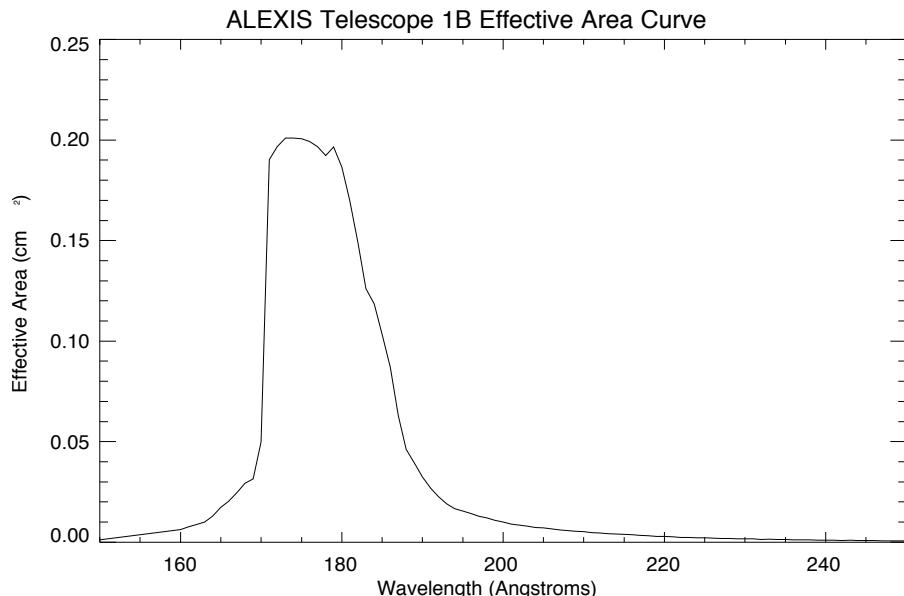




ALEXIS Telescope 1B Area-Solid Angle Response



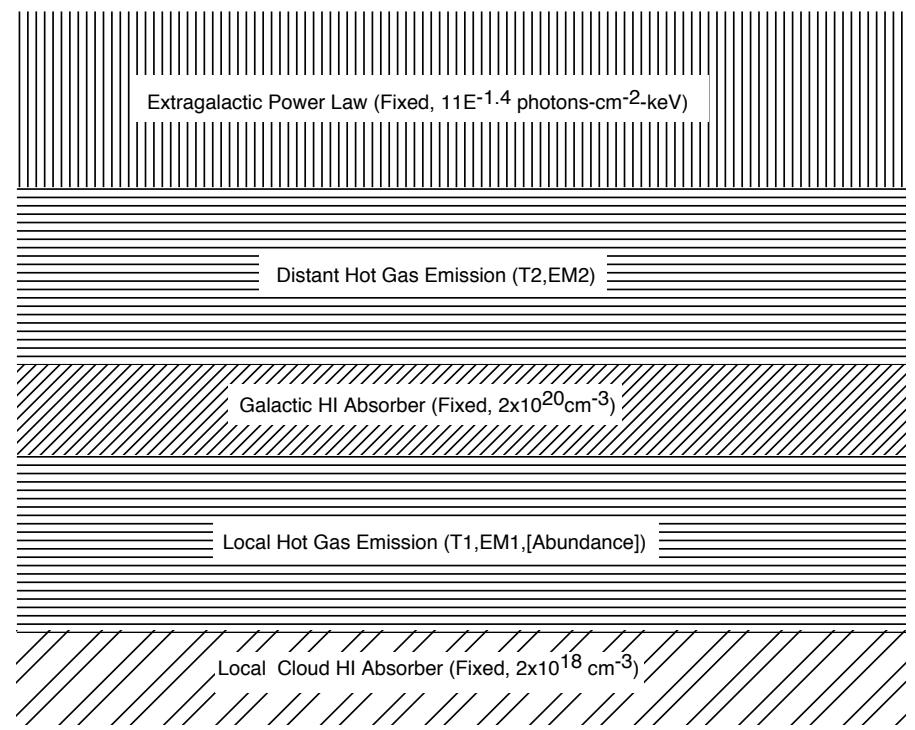
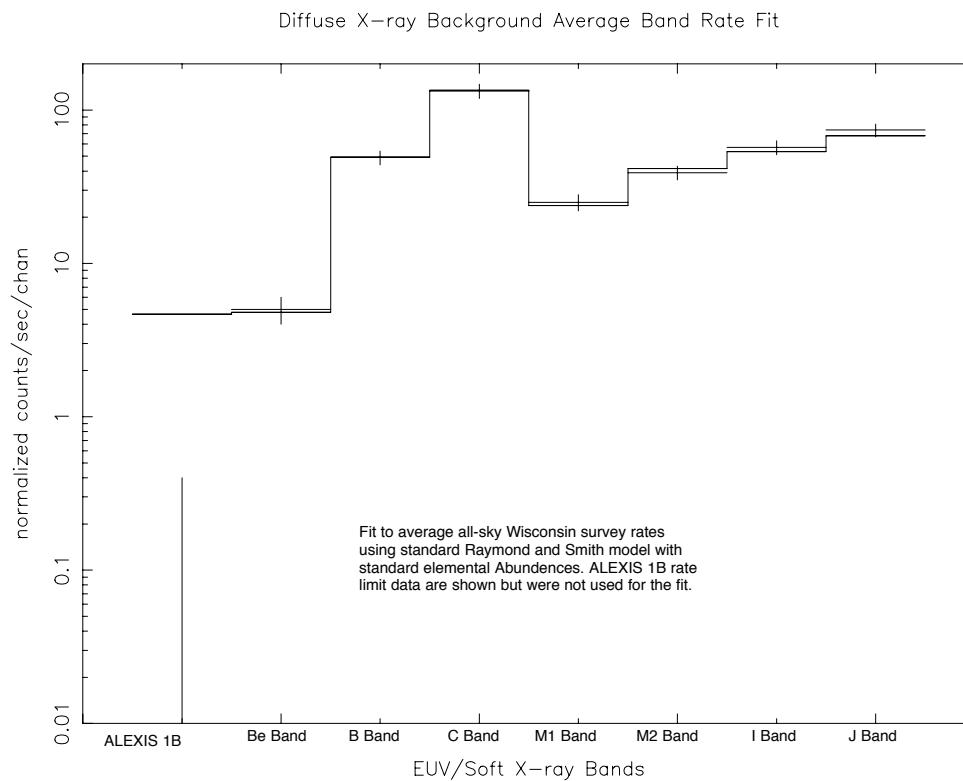
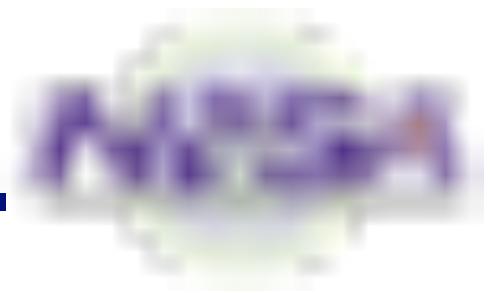
Comparison of Predicted Source Rates with Actual



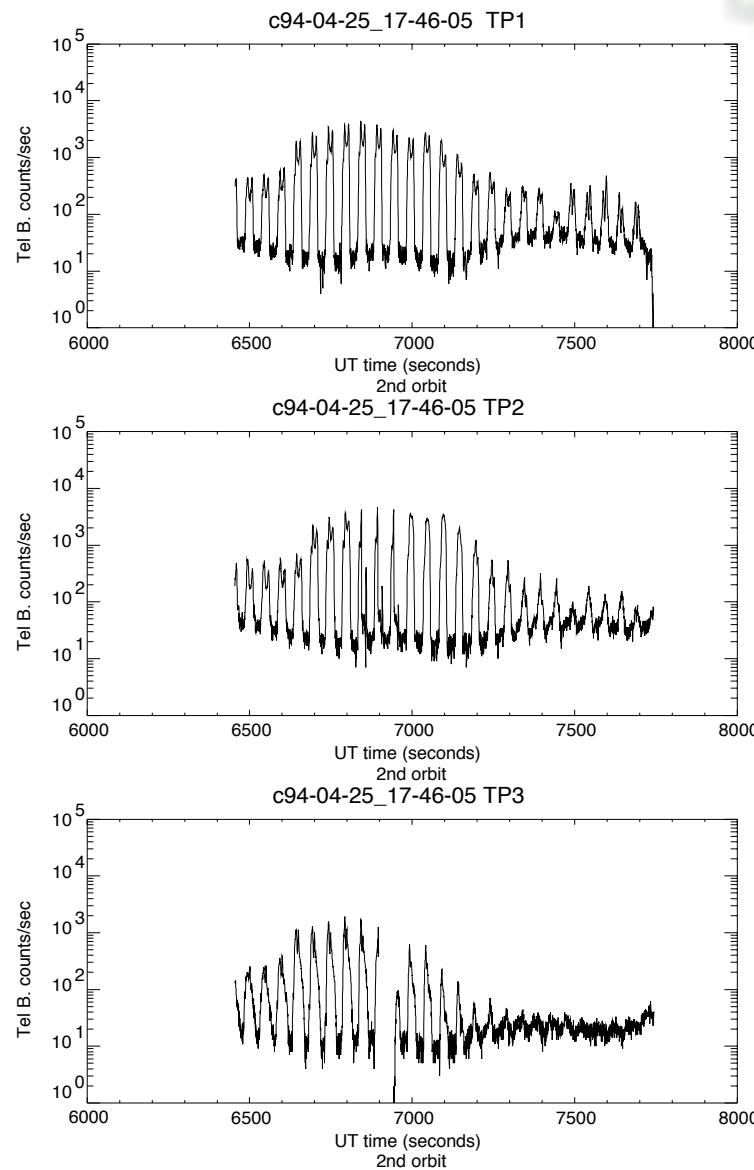
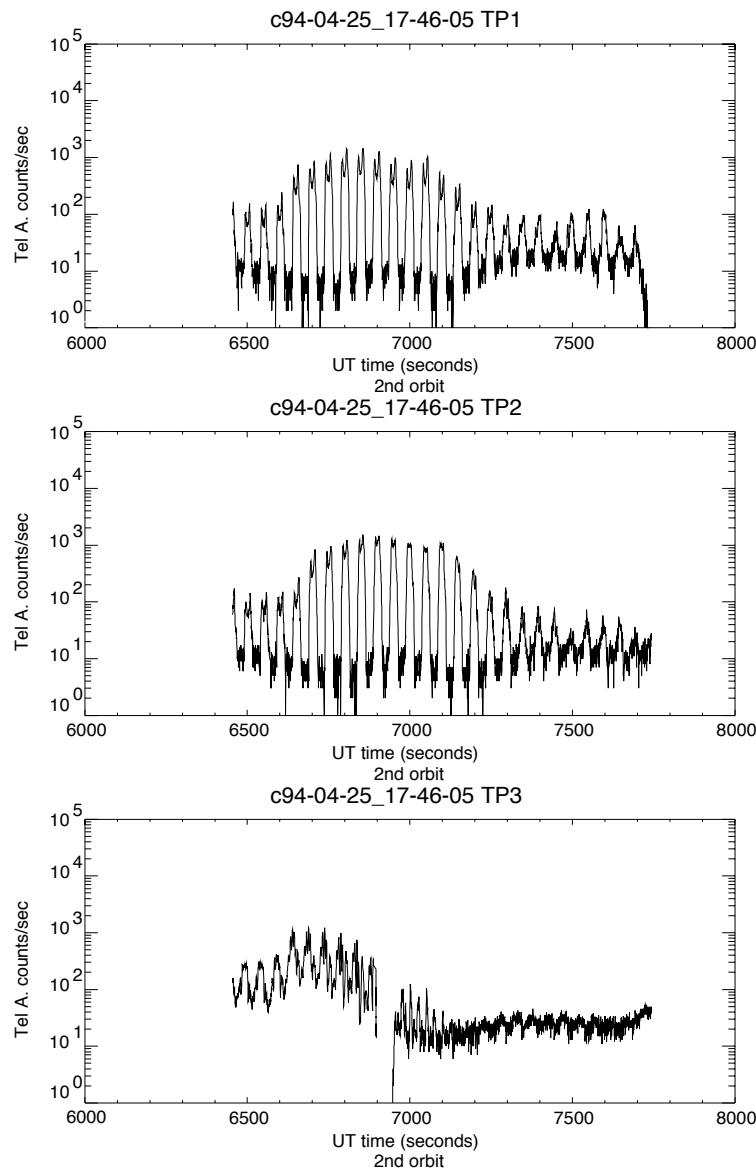
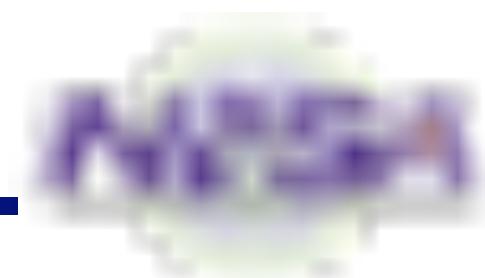
Source	Predicted Rate	Observed Rate
HZ 43	0.478	0.436 ± 0.03
Alpha Cen	0.0186	0.012 ± 0.004
G191 B2B	0.063	0.066 ± 0.002



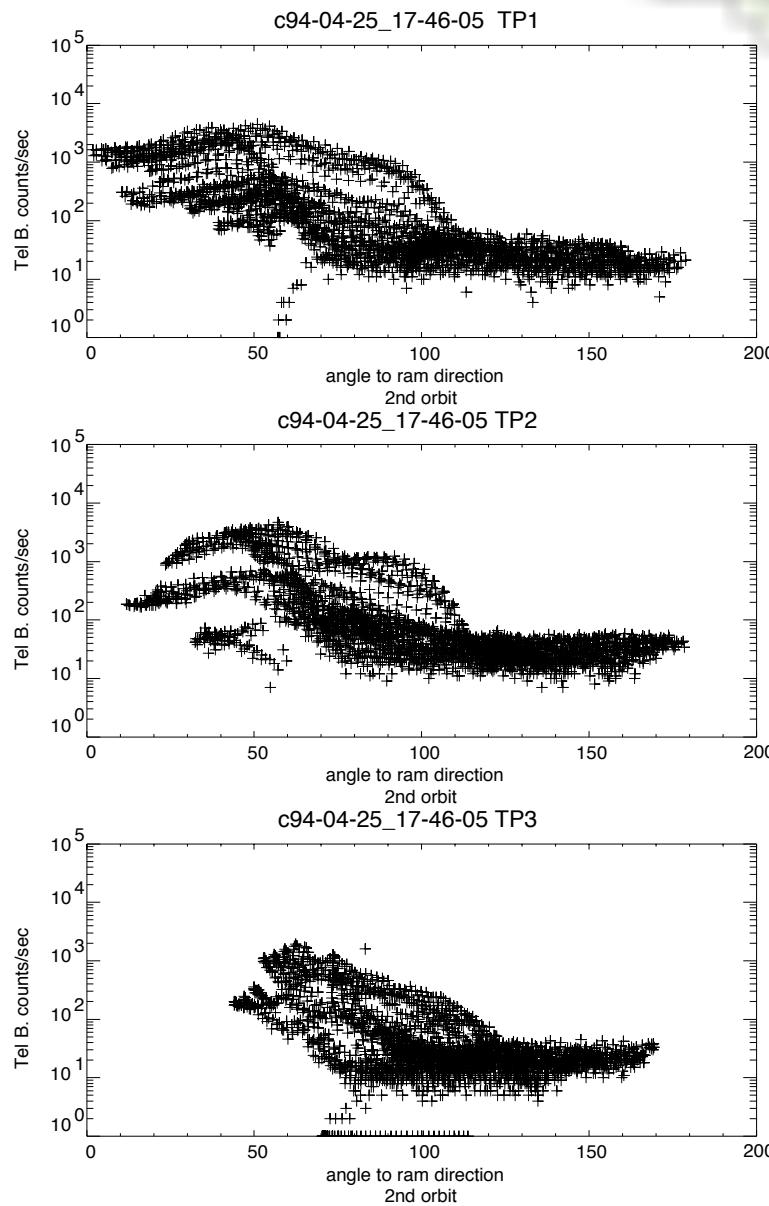
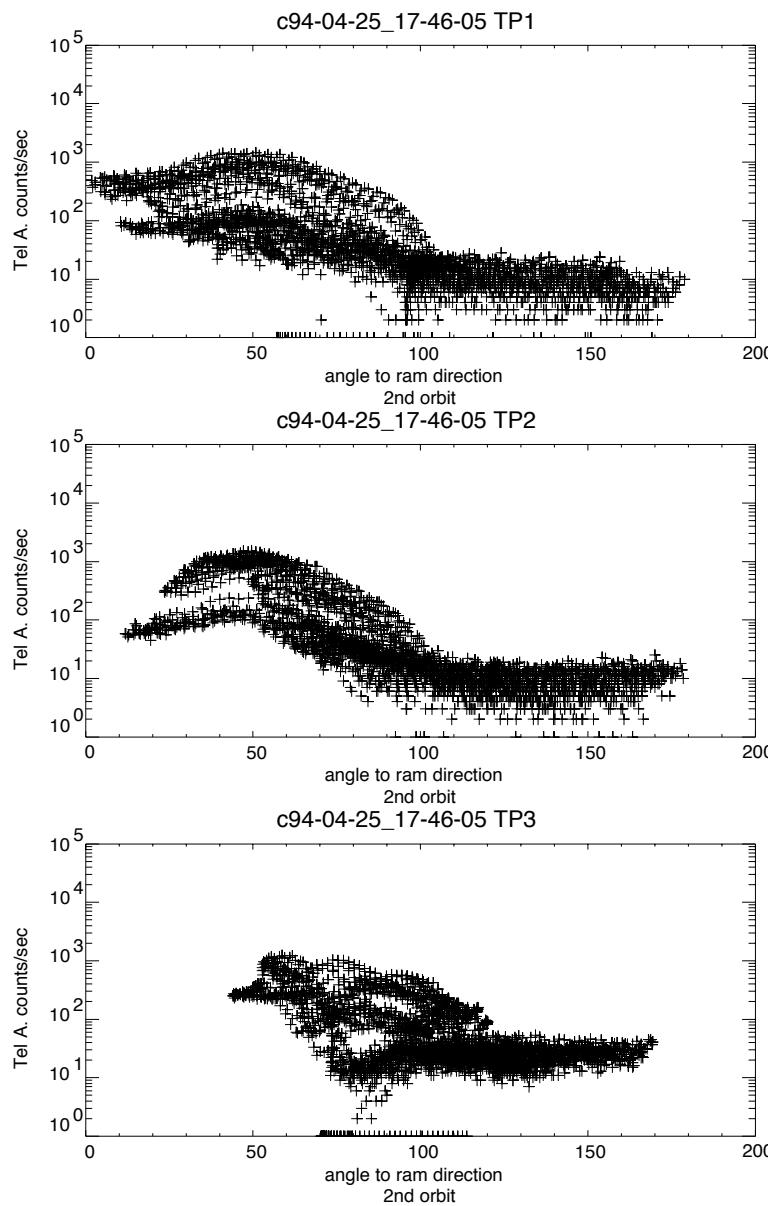
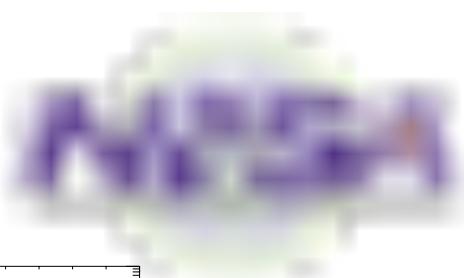
Predicted ALEXIS 1B Average Sky Rate



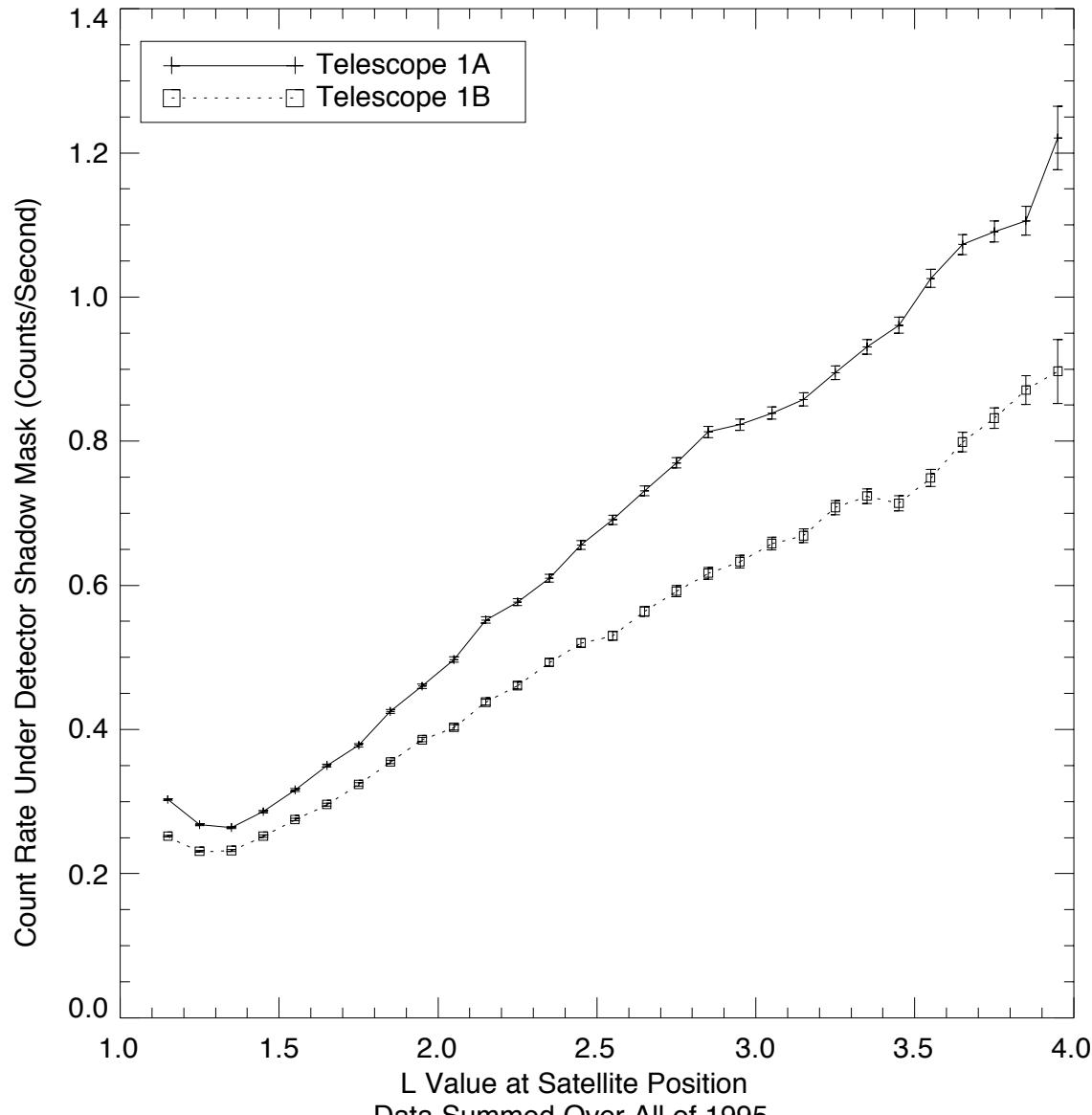
Complex Non-Cosmic Backgrounds



Spin Period Modulation Related to Ram Vector

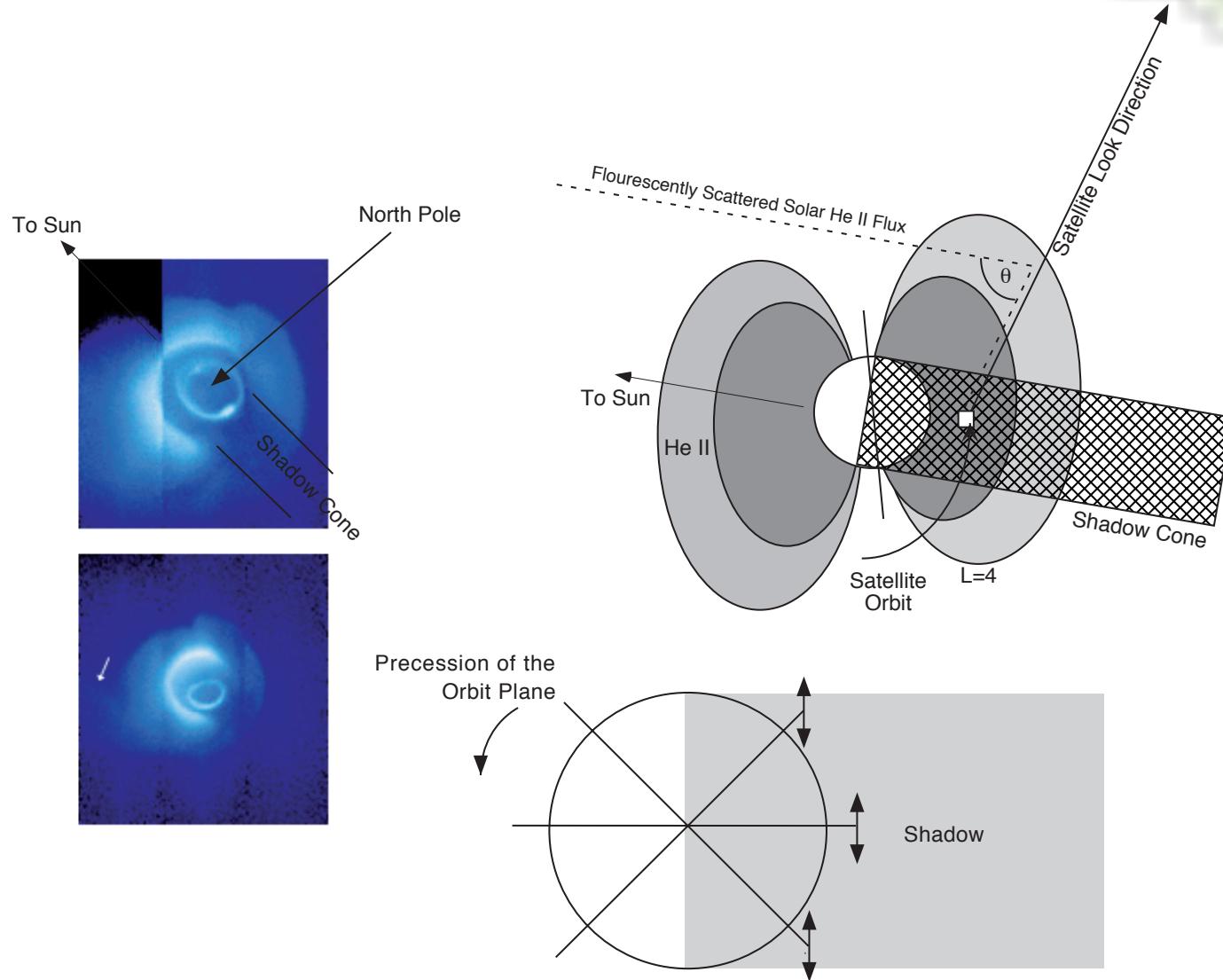


Modeling the Particle Background

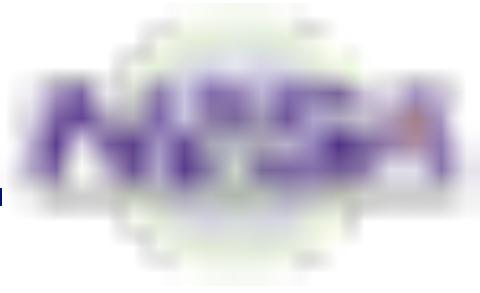


Count rates under the Aluminum shadow masks on the outer edge of each microchannel plate detector as a function of "L" parameter for all of 1995.

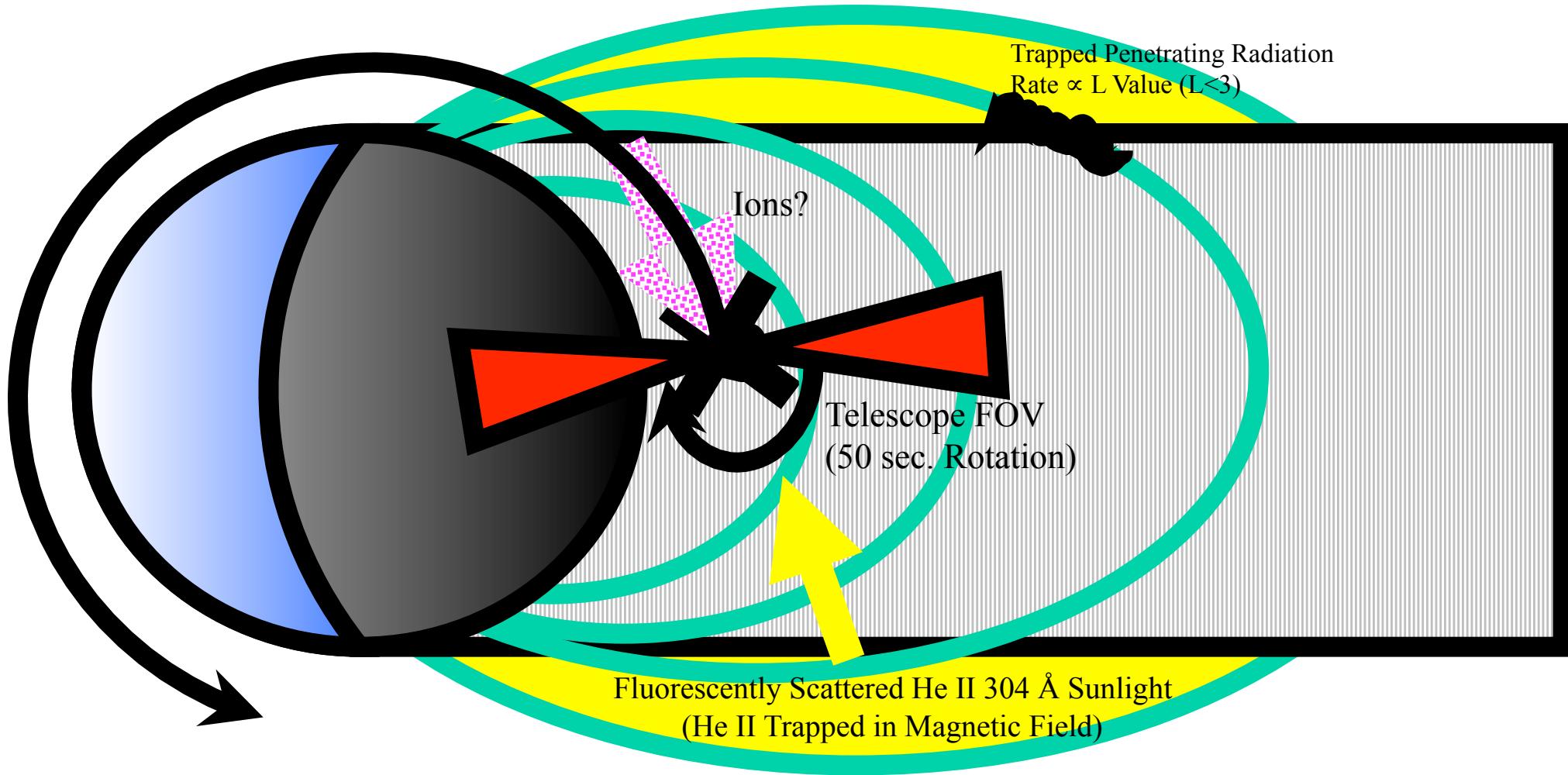
Modeling the He II 304 Angstrom Background



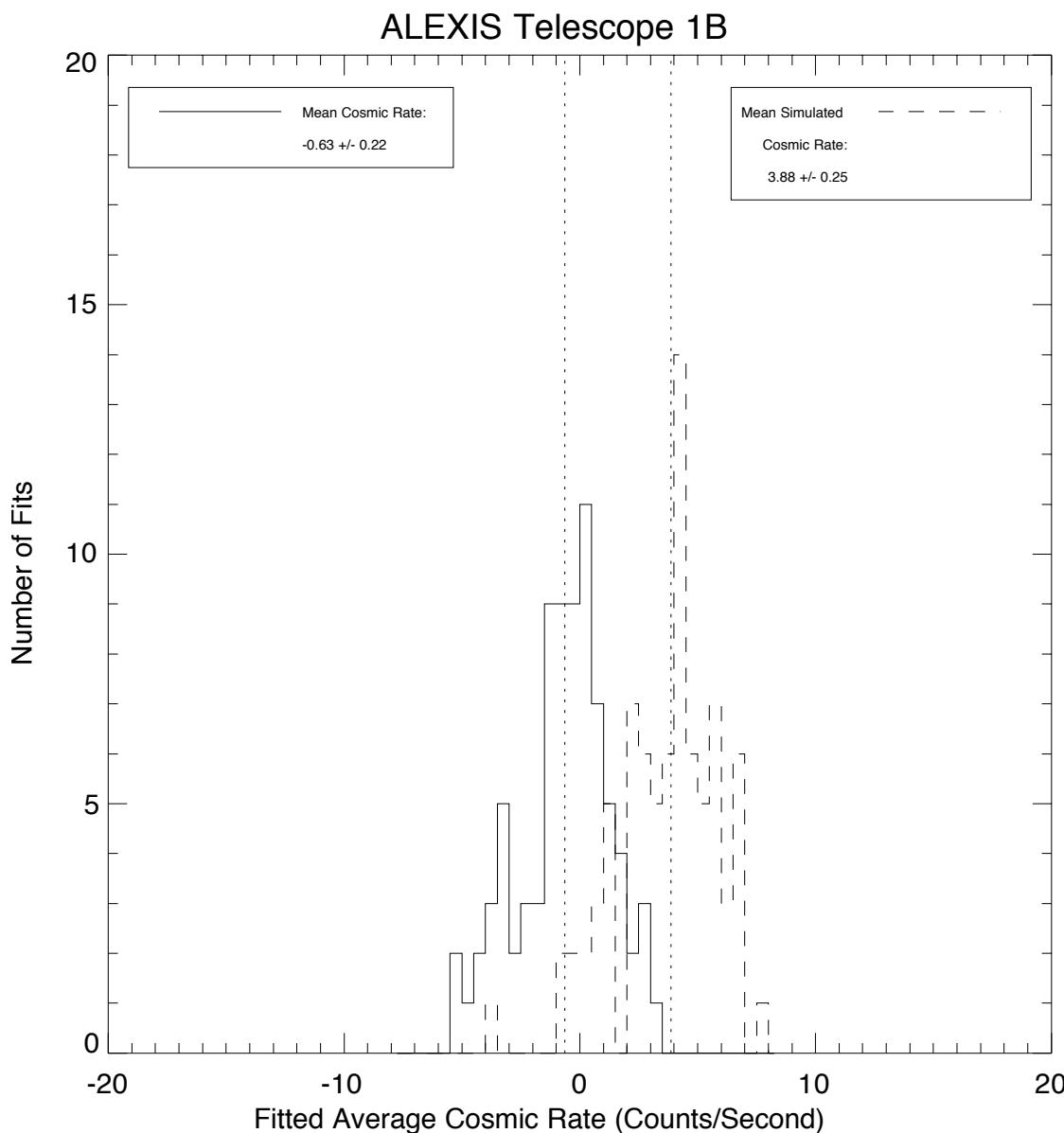
ALEXIS Telescope Non-Cosmic Background Components



Anomalous Background (Ion Induced?)
Eliminated When Telescope Look Direction
 $> 110^\circ$ From Velocity Vector

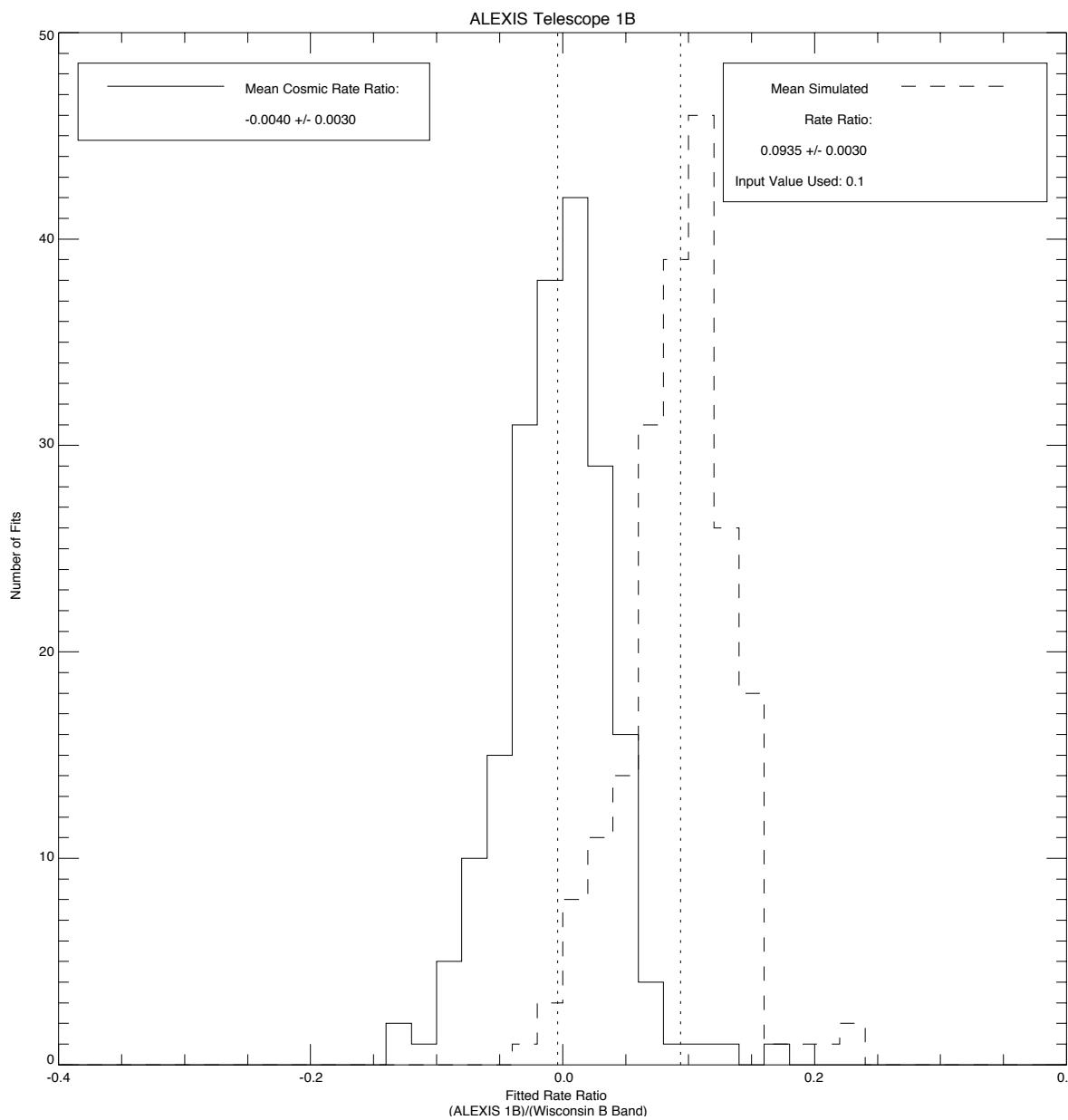


Fitting the Data to a Constant Sky Rate



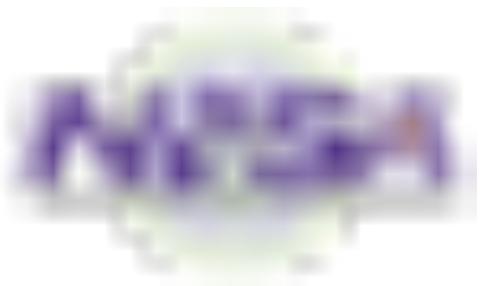
The solid histogram shows the distribution of parameter fit values for an average sky flux count rate over 81 datasets (5 days each) that pass the criteria discussed in the text. The dashed histogram shows the distribution that results from the same analysis applied to the same data but that had random count rate values added on to each rate scalar data point whose means were based on the expected count rate values from the global spectral model and the Wisconsin B band sky map. This plot demonstrates that had a cosmic sky flux of the expected magnitude been present in the data, this analysis technique would have detected it.

Fitting the Data to a Ratio of ALEXIS to Wisconsin B Band Sky Rates



The solid histogram shows the distribution of parameter fit values for an average ratio between an ALEXIS telescope 1B cosmic rate that is proportional to the Wisconsin B band count rate and the actual B band count rate for 5 day datasets that pass the criteria. The dashed histogram shows the distribution that results from the same analysis applied to the same data but that had random count rate values added on to each rate scaler data point whose means were based on the expected count rate values from the global spectral model and the fluxes in the Wisconsin B band map. This shows that had a cosmic sky flux of the expected magnitude and variation been present in the ALEXIS data, this analysis would have correctly recovered the correlation ratio between the two datasets.

Acknowledgments



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The ALEXIS/Blackbeard Project Wishes to Thank:

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And Many More!